

IN THE CLAIMS

Please amend claims 1, 9, and 17-23, as shown. The following listing of the claims replaces all previous listings.

1. (Currently amended) A water-tolerant, regenerable adsorbent for use in an acid gas dry scrubbing process, said adsorbent comprising surface or framework amine-functionalised mesoporous silica or organosilica, wherein amino groups are readily accessible within the pore ~~channels~~ volumes, pore surfaces or pore walls of the mesoporous silica or organosilica, and wherein the adsorbent has a carbon dioxide adsorption capacity of at least 2.50 cc/g at standard temperature and pressure.

2. (Original) The adsorbent of claim 1, wherein the amine-functionalised mesoporous silica or organosilica comprises amine-containing molecules that are covalently bound to the surface of the pore walls.

3. (Original) The adsorbent of claim 2, wherein the amine-containing molecules are amine-containing trialkoxysilane or trichlorsilane.

4. (Original) The adsorbent of claim 1, wherein the pore walls of the amine-functionalised mesoporous silica or organosilica has a hydrophobic surface and amine-containing molecules are dispersed within the hydrophobic surface.

5. (Original) The adsorbent of claim 4, wherein the amine-containing molecules are alkylamines, arylamines or alkylarylamines.

6. (Original) The adsorbent of claim 5, wherein the alkylamines are selected from the group consisting of monoethanolamine (MEA), diethanolamine (DEA), diisopropylamine (DIP), N-methyldiethanolamine (MDEA), 2-amino-2-methyl-1-propanol (AMP), polyethylenimine, β,β' -hydroxyaminoethylether and combinations thereof.

7. (Original) The adsorbent of claim 1, wherein the mesoporous silica or organosilica comprises an amine-functionalised framework.

8. (Previously presented) The adsorbent according to claim 1, wherein the acid gas is carbon dioxide.

9.(Currently amended) A method of dry scrubbing comprising the step of contacting a gaseous stream containing an acid gas to be removed with water-tolerant, regenerable adsorbent comprising surface or framework amine-functionalised mesoporous silica or organosilica, wherein amino groups are readily accessible within ~~the pore channels~~ volumes, pore surfaces or pore walls of the mesoporous silica or organosilica.

10. (Original) The method according to claim 9, wherein the amine-functionalised mesoporous silica or organosilica comprises amine-containing molecules that are covalently bound to the surface of the pore walls.

11. (Original) The method according to claim 9, wherein the pore walls of the amine-functionalised mesoporous silica or organosilica has a hydrophobic surface and amine-containing molecules are dispersed within the hydrophobic surface.

12. (Canceled).

13. (Previously presented) A process for preparing an adsorbent according to claim 2, comprising:

(a) providing a mesoporous silica or organosilica; and

(b) grafting an amine-containing silane to the surface of the mesoporous silica or organosilica to produce the amine-functionalised mesoporous silica or organosilica.

14. (Previously presented) A process for preparing an adsorbent according to claim 2, comprising:

(a) mixing a source of silica or organosilica, an amine-containing silane and an amphiphile molecule under conditions that facilitate self assembly to produce the amine-functionalised mesoporous silica or organosilica.

15. (Previously presented) A process for preparing an adsorbent according to claim 2, comprising:

(a) providing a mesoporous silica or organosilica;

(b) grafting an reactive group-containing silane to the surface of the mesoporous silica or organosilica; and

(c) treating the reactive group-containing mesoporous silica or organosilica with an amine to produce the amine-functionalised mesoporous silica or organosilica.

16. (Previously presented) A process for preparing an adsorbent according to claim 2, comprising:

(a) mixing a source of silica or organosilica, a reactive group-containing silane and an amphiphile molecule to produce the reactive group-containing mesoporous silica or organosilica; and

(b) treating the reactive group-containing mesoporous silica or organosilica with an amine to produce the amine-functionalised mesoporous silica or organosilica.

17. (Currently amended) A process for preparing an adsorbent according to claim 4, comprising:

(a) preparing a mesoporous silica or organosilica in the presence of a swelling agent and selectively extracting the swelling agent to produce a hydrophobic layer on the surface of the mesoporous silica or organosilica; and

(b) treating the mesoporous silica or organosilica produced in step (a) with an amine to produce the amine-functionalised mesoporous silica or organosilica.

~~(c) — mixing a silica source with an amphiphilic molecule having at least one amino group under conditions that facilitate self assembly of the silica source and the amphiphile to produce the amine-functionalised mesoporous silica or organosilica,~~

~~wherein, the amine-functionalised mesoporous silica or organosilica is a mesoporous silica or organosilica having pores filled with amine-containing amphiphilic molecules.~~

18. (Currently amended) A process for preparing an adsorbent according to claim 1, comprising:

(a) mixing a silica source with an amphiphilic molecule having at least one amino group under conditions that facilitate self assembly of the silica source and the amphiphile to produce the amine-functionalised mesoporous silica or organosilica,

wherein the amine-functionalized mesoporous silica or organosilica is a mesoporous silica or organosilica having pores filled with amine-containing amphiphilic molecules.

~~(a) — reacting a silica source with an amphilic molecule; and~~

~~(b) — simultaneously or subsequently adding an amine-containing swelling agent.~~

19. (Currently amended) A process for preparing an adsorbent according to claim 1, comprising:

(a) reacting a silica source with an amphilic molecule; and

(b) simultaneously or subsequently adding an amine-containing swelling agent.

~~(a) — mixing a reactive group-containing silica source with an amphiphilic molecule to produce a mesoporous silica or organosilica having a framework comprising reactive sites; and~~

~~(b) — introducing amino groups at the reactive sites to produce the amine-functionalised mesoporous silica or organosilica.~~

20. (Currently amended) A ~~system~~ process for removal of an acid gas from a gaseous stream, comprising:

(a) mixing a reactive group-containing silica source with an amphiphilic molecule to produce a mesoporous silica or organosilica having a framework comprising reactive sites; and

(b) introducing amino groups at the reactive sites to produce the amine-functionalised mesoporous silica or organosilica

~~(a) two or more sorbent beds comprising the adsorbent of claim 1;~~

~~(b) valve means for controlling gas flow through the sorbent beds; and;~~

~~(c) pump means for controlling gas pressure in the system.~~

21. (Currently amended) The A system for removal of an ~~according to claim 21,~~
~~wherein the acid gas is carbon dioxide~~ from a gaseous stream, comprising:

(a) two or more sorbent beds comprising the adsorbent of claim 1;

(b) valve means for controlling gas flow through the sorbent beds; and;

(c) pump means for controlling gas pressure in the system.

22. (Currently amended) The system according to claim 21, wherein the ~~adsorbent is pelletized with a binder that is an inert secondary material~~ acid gas is carbon dioxide.

23. (Currently amended) The system according to claim 21, wherein the adsorbent is pelletized with a binder that is an ~~active~~ inert secondary material.

24. (Previously presented) The system according to claim 21, wherein the adsorbent is pelletized with a binder that is an active secondary material.

25. (Previously presented) The method according to claim 9, wherein the mesoporous silica or organosilica comprises an amine-functionalized framework.